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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Optical functional films - Measurement method for microstructure thickness

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1.Structure and Drafting Rules of Standardization Documents"

Drafting.

This document was drafted with reference to ISO 9220.2022 "Scanning Electron Microscope Test Method for Coating Thickness of Metal Coatings", and the degree of consistency is not equivalent.

Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents.

1 Scope

This document describes the detection of cross-sectional microstructure thickness of optically functional thin films (hereinafter referred to as thin films) by scanning electron microscopy (SEM).

(hereinafter referred to as cross-sectional thickness) method.

This document is applicable to the thickness test of single-layer or multi-layer structures of optical functional films with a thickness of not less than 50nm.

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document

through normative references in the text. Among them, the dated quotations

For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to

this document.

GB/T 27788 Guidelines for calibration of magnification of scanning electron microscope images for microbeam analysis

GB/T 33376 Optical functional film terms and definitions

3 Terms and definitions

The terms and definitions defined in GB/T 33376 and the following apply to this document.

3.1

Original film and functional film with excellent optical properties for flat panel displays.

[Source. GB/T 33376-2016, 2.1.19, modified]

4 Principles

A sample is cut from the sample to be tested, and the cross section of the sample is ground, polished, etched, and ultra-thin sectioned. Use corrected

SEM measures cross-sectional thickness.

NOTE. Appendix A gives guidance.

5.1 SEM

The resolution should be less than 50nm.

5.2 SEM stage micrometer ruler

For the magnification used to calibrate the SEM, the error value of the uncertainty should be less than 5%.

6.1 Rough surface

If the cross-section of the sample or the surface of the substrate is rough, the interface line of the cross-section will be irregular, making it impossible to accurately measure the thickness.